

I. Project Title: **Population estimate of humpback chub in Westwater Canyon, Colorado River, Utah.**

II. Principal Investigators:

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III. Project Summary:

The RIP recently identified recovery goals for the endangered humpback chub. Recovery goals are based in part on maintaining populations of humpback chub in several locations, among which is the Westwater Canyon population on the Colorado River. Identifying, maintaining, and monitoring a population necessitates obtaining accurate population estimates.

Objectives:

1. to obtain a population estimate of adult humpback chub ( 200 mm) in Westwater Canyon
2. to determine mean estimated recruitment of naturally produced subadult humpback chub (150-199 mm) in Westwater Canyon

Three sampling trips were conducted through Westwater Canyon on September 12-19, October 9-15, and November 3-9 to complete the first year of the current three year population estimate. Daily mean flow during sampling ranged from 5,510 to 2,870 cubic feet per second (cfs). Daily mean water temperature during sampling ranged from 16.7 °C to 7.5 °C. A total of five sites were sampled throughout the canyon over six or seven nights.

A total of 298 individual adult humpback chub and 636 individual adult roundtail chub were collected in Westwater Canyon by trammel netting, electrofishing, hoop netting and minnow trapping. Trammel nets yielded the highest catch of both species. Average total length of humpback chub caught via all methods was 267.3 mm with a range of 190–392 mm. Average total length of roundtail chub caught via all methods was 261.1 mm with a range of 111–442 mm. An additional 120 subadult chub were caught using various methods with an average total length of 131.8 mm and a range of 52–187 mm. Twelve humpback chub and nine roundtail chub were caught among passes in 2003. Long-term recaptures (from previous years) were observed for both species in all trips. However, the number of long-term recaptures is down from 2000 and similar to 1998.

IV. Study Schedule:

- a. Initial year: 2003
- b. Final year: 2005

V. Relationship to 2003 RIPRAP:

Colorado River Action Plan: Mainstem (pg. 36)

V.C. Estimate humpback chub populations

V.C.2. Westwater

VI. Accomplishments of FY 2003 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Three sampling trips were conducted through Westwater Canyon on September 12–19, October 9–15, and November 3–19. Five sites were sampled on the first pass (September 12–19): Miners Cabin (RM 124), Upper Cougar (RM 122.5), Lower Cougar (121.5), Hades Bar (RM 120), and Big Hole (RM 116). The Big Hole site (RM 116) was dropped from the second (October 9–15) and third (November 3–9) passes due to a lack of humpback chub present below the rapids (a single roundtail chub (442 mm) was captured at Big Hole on the first pass).

Mean daily flows and temperature for each pass were recorded by USGS gage #09163500 (Colorado River near Colorado-Utah State Line) (Figure 1). Mean flow for the first pass was 4,283 cfs (3,550–5,510 cfs). Mean temperature was 16.2 °C (15.3–16.7 °C). Mean flow for the second pass was 3,234 cfs (3,120–3,360 cfs). Mean temperature was 14.1 °C (11.6–16.5 °C). Mean flow for the third pass was 3,001 cfs (2,870–3,090 cfs). Mean temperature was 8.2 °C (7.5–9.5 °C).

Sampling was conducted for two nights at Miners Cabin, one night at Upper Cougar, two nights at Lower Cougar, one night at Hades, and one night at Big Hole (first pass only). Humpback chub and roundtail chub were targeted at these sites using trammel nets, electrofishing, hoop nets and minnow traps. Trammel nets were set in late afternoon each day, checked approximately every two hours, and pulled around midnight. The nets were reset the next morning prior to dawn, checked approximately every two hours and pulled



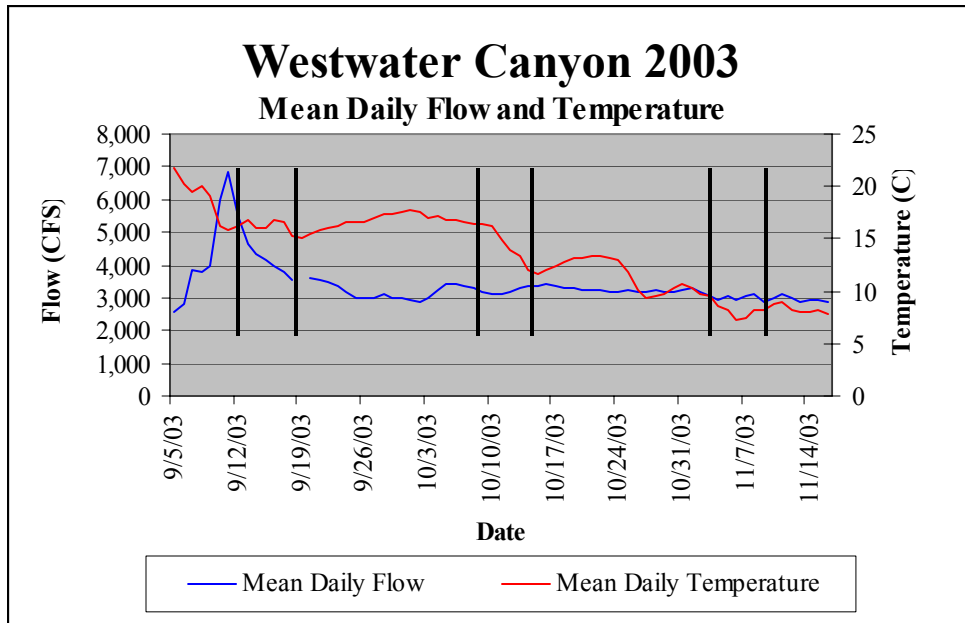


Figure 1. Mean daily flow (cfs) and mean daily temperature ( $^{\circ}\text{C}$ ) for Westwater Canyon between September 5 and November 16, 2003, as recorded by USGS gage #09163500 (Colorado River near Colorado-Utah State Line; provisional data). Vertical lines within graph demarcate Pass One (September 12-19), Pass Two (October 9-15), and Pass Three (November 3-9).

mid-morning until late afternoon. Seven to twelve trammel nets were set per site depending upon habitat availability. Electrofishing was conducted subsequent to trammel nets being pulled each night around midnight. Hoop nets and minnow traps were set each afternoon and pulled the subsequent morning. All chubs were identified to species, scanned for a PIT tag, PIT tagged (if necessary), measured (total length and standard length; mm), weighed (g), principle dorsal and anal fin rays counted and released.

A total of 298 individual adult humpback chub and 636 individual adult roundtail chub were captured using the various methods in 2003. An additional six humpback, 25 roundtail, and 121 *Gila* subadults were captured. The 121 *Gila* were identified as such because they were too small to reliably identify. Length-frequency histograms are presented in Figures 2 and 3 for the above information.

Trammel netting resulted in 1,729.34 hours of effort. Electrofishing yielded 2.04 hours of effort. Hoop netting resulted in 459.17 hours of effort. Minnow trapping netted 254 hours of effort. Catch per unit effort (CPUE) is presented for each species by sampling approach in Table 1. Most notable of the CPUE values for 2003 are those for electrofishing. The electrofishing catch rates for chub in 2003 are some of the highest ever recorded by the Utah Division of Wildlife Resources since monitoring began in Westwater Canyon.

## 2003 WW HBC Length-Frequency

n=304 + 121 subadult Gila

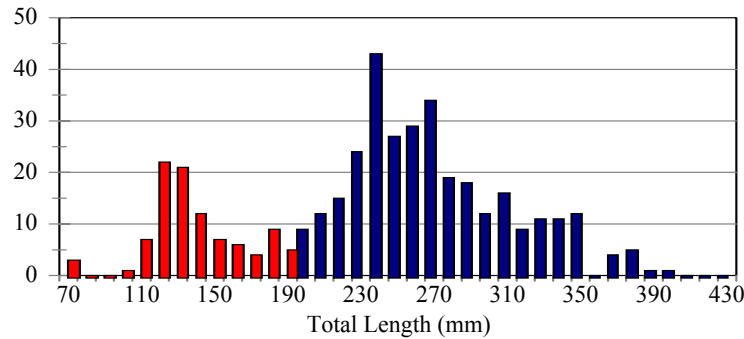


Figure 2. Length-frequency histogram for 2003 humpback chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

## 2003 WW RTC Length-Frequency

n=661 + 121 subadults

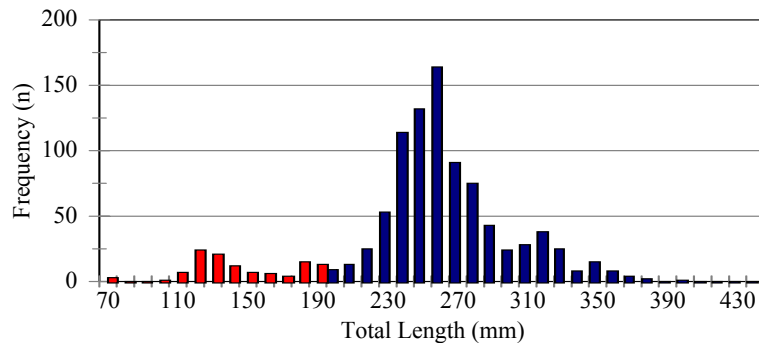


Figure 3. Length-frequency histogram for 2003 roundtail chub in Westwater Canyon. Subadults in red were identified as *Gila* and are represented in the humpback chub and roundtail chub histograms.

Recapture rates for humpback chub and roundtail chub were similar to 1998 rates for both long-term recaptures and within-year recaptures. Of 298 total adult humpback chub captured, 50 of those had been PIT tagged in previous years. Twelve of those 298 individuals were recaptured within 2003. Of 636 total adult roundtail chub captured, 43 of those had been PIT tagged in previous years. Nine of those 636 individuals were recaptured within 2003.

Table 1. Catch per unit effort (CPUE) for humpback chub, roundtail chub, and *Gila* by sampling approach for Westwater Canyon in 2003.

	<i>Trammel Nets</i>	<i>Electrofishing</i>	<i>Hoop Nets</i>	<i>Minnow Traps</i>
<b><i>Humpback Chub</i></b>	0.168	8.824	0.000	0.004
<b><i>Roundtail Chub</i></b>	0.468	34.804	0.020	0.000
<b><i>Gila</i></b>	0.004	40.196	0.070	0.000

Table 2. Adult humpback chub and roundtail chub captures, long-term recaptures, and within-year recaptures for Westwater Canyon 1998-2000, 2003.

<i>Year</i>	<i>HB</i>	<i>Long-term Recaps</i>	<i>Within-year Recaps</i>	<i>RT</i>	<i>Long-term Recaps</i>	<i>Within-year Recaps</i>
<b>1998</b>	488	54	14	389	42	9
<b>1999</b>	281	65	10	486	70	13
<b>2000</b>	279	76	6	527	73	18
<b>2003</b>	298	50	12	636	43	9
<b><i>Total</i></b>	<i>1346</i>	<i>245</i>	<i>42</i>	<i>2038</i>	<i>228</i>	<i>49</i>

Electrofishing was not conducted to the extent planned in 2003 due to mechanical failure in the motors during the first pass. Thus, electrofishing was conducted only on the second pass. However, the little electrofishing that was conducted was extremely productive, and may have helped identify a strong recruitment year coming.

Another interesting finding occurred on the night of November 3, 2003, at Miners Cabin (first night of the final pass). During that evening and the subsequent morning, 183 chub were captured in the trammel nets. Only 24 of these were humpback chub. The remainder were roundtail chub. Of particular interest, 75% of these fish were captured in the initial net set and an extremely small portion were recaptures. Apparently, these fish had moved into the area for some reason. Furthermore, they had move into the area from someplace that they had not previously been available to be tagged.

#### VII. Recommendations

1. Electrofishing should be conducted during the first two passes of 2004 and 2005.
2. Radiotelemetry tracking of humpback chub and roundtail chub may help explain movement patterns that have not been documented.
3. An additional night of sampling should be added at the Upper Cougar site to more adequately sample that area.
4. An additional site could be added between Miners Cabin and Upper Cougar to provide more sampling coverage of the canyon.

#### VIII. Project Status: Ongoing

First year of three for project completed.

#### IX. FY03 Budget:

A. Funds budgeted:	\$ 85,500
B. Funds expended/obligated:	\$ 68,400
C. Difference:	\$ 17,100
D. Percent FY2003 work completed:	80%
E. Recovery Program funds spent for publication charges:	\$ 0

#### X. Status of data submission:

Data will be entered on the computer and transferred to USFWS by January 15, 2004.

#### XI. Signed: J. Michael Hudson Date: 11/25/2003